



**PROGRAMME DESIGN DOCUMENT FORM FOR
SMALL-SCALE CDM PROGRAMMES OF ACTIVITIES (F-CDM-SSC-PoA-DD)
Version 02.0**

PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

Heat Retention Cooking in Less Developed Countries

Version 3

Date of Completion: 15/03/2013

A.2. Purpose and general description of the PoA

Policy/measure or stated goal

The programme aim is adoption of heat retention cooking in Rwanda. This will reduce greenhouse gas emissions and deforestation, while improving the livelihoods of low-income families by saving cash expenditure on cooking fuel and by improvement of health and employment opportunities.

The heat retention cooker disseminated by this programme is trade-marked the “Wonderbag” (WB) and is a thermally insulated bag into which a cook transfers a pot heated on a stove. The food in the pot continues to cook inside the HRC, while the stove is no longer in use, so conserving fuel.

The predominant cooking fuels for low-income families in less developed countries are firewood and wood-charcoal. The countries engaging in this program are experiencing persistent rates of deforestation, and their firewood and wood-charcoal resources are non-renewing, so resulting in atmospheric greenhouse gas emissions during combustion. By virtue of reduction in cooking fuel usage, the programme fulfils its aim of decreasing green-house gas emissions.

While the focus is primarily on domestic kitchens, the programme also encompasses institutional and commercial kitchens, such as in schools, offices, restaurants, and street vending of cooked food.

It is estimated that the PoA will save 283,179tCO₂e over the first seven years of operation based on projections of CPAs.

Implementation framework

The coordinating/managing entity (CME) is Natural Balance International Ltd (NBI). NBI will act as the focal point for the Executive Board of the CDM in all aspects relating to validation, verification, registration and issuance of carbon credits generated by the programme.

NBI's role as CME is to manage and maintain a platform which allows project implementation bodies to come forward. As and when the candidates apply to join the platform, develop and prove to NBI their capability in order to be eligible, they sign partnership agreements with the CME in order to operate as CME Agents (CMEAs). NBI provides on-going training to CMEA personnel, undertakes that the CMEA is not involved in any other CDM project or activity disseminating similar technology, and continuously improves the PoA management system.

The CMEAs undertake manufacture, distribution, and user- support services for a set of Component Programme Activities (CPAs).

NBI as the CME provides guidance, oversight and supervision to the CMEAs, and is responsible for periodic monitoring functions, principally annual sampling surveys and annual monitoring reports for submission to DOEs for verification of emissions reductions.

CMEAs are responsible for record-keeping on a continuous basis, in compliance with the monitoring plan of the POADD and CPADD, albeit with direction, supervision and guidance from the CME. The CME provides a central control process over-seeing all documents and records issued by the CMEAs.

There may be more than one CMEA operating in the same geographic area, and the CPAs allocated to each CMEA may overlap geographically, in accordance with paragraph 9 of Annex 32 to the EB47 Report.

NBI shall direct and co-ordinate the activities of the CMEAs, and allocate to each a specific group of CPAs. NBI will have the authority to change the allocation of CPAs from one CMEA to another in ensure effective implementation and data collection; NBI shall be responsible for all CPAs and act as the CPA implementer in place of CMEAs in any instance where a CMEA is not available or not eligible. NBI shall control the size of each CPA and collate the data collected by each CMEA into a central Wonderbag User Database (WD).

Confirmation that the proposed PoA is a voluntary action by the Coordinating/Managing Entity.

There is no law, policy or mandatory requirement in Rwanda stipulating the adoption of Heat Retention Cookers. This proposed SSC-PoA is a voluntary action by the CME.

A.3. CMEs and participants of PoA

The CME for the PoA is Natural Balance International Ltd (NBI). NBI will communicate with the Executive Board of the CDM.

Annex 38 to EB55 Report, paragraph 8, states that “the operators of individual CPAs are not required to be project participants”. In this programme, the CMEAs are not project participants.

A.4. Party(ies)

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Rwanda (Host)	Natural Balance International Ltd	No
UK	ABHAssociates Ltd, UK	No

A.5. Physical/ Geographical boundary of the PoA

The borders of the Republic of Rwanda constitute the geographical area within which all CPAs will be implemented. All national and sectoral policies and regulations applied by the Government of Rwanda

are taken into consideration as evidenced by the LoA provided. The physical delineation of the project activities is defined by the kitchens to which the Wonderbags are registered under each CPA.

The intention of the PoA is to expand to other countries particularly Least Developed Countries (LDC's) after registration over the lifetime of the PoA; at these times the geographical boundary will be amended as appropriate.

A.6. Technologies/measures

The Wonderbag (WB) is a heat-retention cooker. It is an insulated container designed to hold a hot cook-pot safely for several hours, so that food can be cooked through conservation of heat. When using the device, cooking is done in two stages: first, conventionally on the stove, bringing the food up to temperature and boiling for long enough to ensure that high temperature is achieved throughout. Second, the pot is immediately transferred to the WB where it is thermally insulated and continues to cook. Images of Wonderbags are found below:



The WB consists of a filling of insulation material, either polyurethane foam (PUF) foam chips or expanded polystyrene (EPS) granules, sown into a fabric lining. The choice of between PUF or EPS depends on factors such as supply availability and logistics.

The Wonderbag has two principal components, a lid and a bag. Ancillary components are a drawstring and a toggle to fasten the drawstring. The bag comprises the PUF or EPS and two pieces of fabric cut into equal circles and sown together to form ten side pockets in addition to a circular pocket forming the base of the bag. All eleven pockets are filled with the PUF or EPS. The lid is made from the same fabric and also contains the EPS/PUF. The minimum specification for weight of PUF chips in the bag is 858 grams in the 10 side compartments with a 30 mm thick layer of PU foam in the base. The minimum specification for size of the fabric of the bag is a (laid flat and unfilled), is a diameter of 1100mm. Manufacturing is governed by comprehensive quality control and inspection procedures to ensure that the specified insulation materials and fabrics are used the correct quantities, in line with American Society for Testing and Materials (ASTM) Committee on E11 on Quality and Statistics guidelines.

The performance specification is a test of minimum food temperature after a specified period of time cooked in the Wonderbag, taking a long-cooking food for the test protocol (the benchmark food is dry beans). The beans are boiled so that the temperature at start of the test is the water boiling temperature in local ambient conditions. The specified test period is six hours and the specified minimum acceptable temperature at the end of six hours is 65 degrees Centigrade.

A.7. Public funding of PoA

The PoA has not and will not receive public funding from Parties included in Annex I resulting in a diversion of official development.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

The activities encompassed by this PoA could not occur without its implementation, for the following reasons:

Before being included in the PoA, all activities encompassed are verified as compliant with the additionality criteria prescribed by the CDM. Since these activities are small-scale, paragraph 2.c of Annex 27 of EB 68 applies.

- Before being included in the PoA, all activities are verified as having a starting date subsequent to 27/02/2013, that being the date at which the Global Stakeholder Process was launched at commencement of the validation process.
- The project participants have confirmed that in Rwanda there is no national law, policy or mandatory requirement stipulating the adoption of heat retention cookers, and that the CME is under no legal obligation to undertake this programme. Thus this proposed PoA is a voluntary action.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

In compliance with the “*Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities*”, version 02.1 (EB 70, Annex 5), the CPAs shall only be included under this PoA if they comply with the following criteria:

Criteria	Required characteristics of all CPAs
(a) The Wonderbags included in the CPA will be distributed within the geographical boundary as specified in section A.5 of this POA.	CPA implementation arrangements apply exclusively to distribution within the geographical boundaries defined in Section A.5.
(b) Double counting of emission reductions shall be prevented in each CPA through an effective Wonderbag identification system	CPAs have an identification system consisting of labelling each Wonderbag with a Wonderbag logo and serial number which is represented on the Wonderbag User Database.
(c) Each CPA shall specify the level and type of service of the Wonderbags, and provide performance specifications in compliance with suitable sampling survey protocols;	CPAs disseminate Wonderbags which comply with the technical description and minimum specifications defined in Section A6 of the PoA-DD.
(d) The CPA shall have a start date of 01/03/ 2012, this being subsequent to start of the GSC, or date of first adoption of a Wonderbag, whichever is later.	CPAs are collectively characterized by supporting documents which include (a) financing agreements on which the project launch was contingent, dated prior to this date and (b) distribution database (Wonderbag user Database) which demonstrates that all Wonderbag adoptions take place after this date.



(e) The CPADD shall comply with the applicability and other requirements of the applicable methodology AMS II.G v3	CPAs compliant with eligibility criteria (c), (k) and (n) are compliant with the methodology AMS II.G v3 as collectively detailed in the PoADD and the supporting excel calculations.
(f) The circumstances of the CPA are such that it could not occur without the POA being in place.	<p>The CPA will demonstrate the following conditions in order to confirm that it could not occur without the PoA being in place::</p> <ol style="list-style-type: none"> 1. The CPA limits user distribution to households, communities or Small and Medium Enterprises (SMEs) as per paragraph 2.c of Annex 27 of EB 68 2. The technology deployed in the CPA complies with the specification of section A.6. of the POADD. This confirms the physical dimensions of the Wonderbags and therefore their maximum energy saving capacity. 3. Each Wonderbag user will save less than 9GWH_{th}/year representing 5% of the small-scale threshold as per paragraph 2.c of Annex 27 of EB 68.
(g) Local stakeholder consultations and environmental impact analysis is undertaken at PoA level and therefore this criterion is not applicable.	Not applicable as local stakeholder consultation and environmental impact analysis is undertaken at PoA level.
(h) No funding from Annex I parties, if any, results in a diversion of official development assistance;	The CPA implementer will confirm that there is no funding from Annex I parties. In case there is funding from Annex I parties the Annex I party will confirm that this does not result in a diversion of official development assistance.
(i) The target group(s) of the CPA are one, or more than one, of the following: Households, communities or SMEs using wood-fuel for cooking	The CPAs are consistent with the target groups defined by the PoADD, namely households, communities or SMEs using wood-fuel (fire-wood and wood-charcoal) for cooking. This is demonstrated in the CPA-DD monitoring plan..
(j) The CPA monitoring plan shall include sampling and survey approaches consistent with the relevant standard from the Board and the applied methodology	The CPAs concur with the applicable methodology AMS II.G v3 and the “ <i>Standard for sampling and surveys for CDM project activities and Programme of Activities</i> ”, Version 3 (EB 69, Annex 4) and reflect the sampling plan as described on PoA level.
(k) The CPA shall in aggregate meet the small-scale threshold criteria of 180GWH _{th} / year and shall remain within that threshold throughout the crediting period of the CPA;	The CPAs save less than 180 GWh _{thermal} /year in aggregate, in all years of the crediting period as will be demonstrated in the Wonderbag User Database (WD).
(l) The individual devices disseminated by the CPA have an energy saving which complies with the approved Guidelines on assessment of debundling	Each individual device disseminated by the CPAs has an energy saving which is less than 1% of the threshold specified for the CPA ¹ which is 1.8 GWh _{thermal} /year as demonstrated by calculations.

¹ In compliance with the “Guidelines on assessment of debundling for SSC project activities, v03 (EB 54, Annex 13, par.10) for determining the occurrence of debundling under a Programme of Activities (PoA)”, if each of the independent

for SSC project activities	
(m) The CPA is located in a country classified by the UN as a LDC), where biomass cooking fuel is not 100% demonstrably renewable, and where there exist indicators of NRB	<p>The CPA is located in a LDC and</p> <ul style="list-style-type: none"> DRB as defined by the applied methodology is not 100% Evidence exists of at least two of the following indicators of NRB (a) increased time spent or distance travelled for gathering fuel-wood, (b) information on depletion of carbon stocks, (c) increasing price of fuel-wood, (d) trends in types of cooking fuel used, indicating scarcity of woody biomass. Rwanda demonstrates at least two of these indicators. Evidence shall also be provided that the trends identified are not occurring due to the enforcement of local/national regulations.
(n) Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics	CPAs are all in countries where non-renewable biomass has been used since 31 December 1989 as will be demonstrated in the CPA-DD..

B.3. Application of methodologies

The programme applies AMS IIG, “Energy efficiency measures in thermal applications of non-renewable biomass”, Version 03, Sector Scope 3.

The sampling approach is the use of internationally recognized guidelines for Kitchen Performance Tests, as required by the methodology Para 6 Option 1, for measurement of savings of non-renewable biomass.

The sampling requirement of the methodology is for 90/10 confidence/precision for annual monitoring of each CPA, and 95/5 for biennial monitoring².

For this PoA multiple CPAs will be sampled together. A confidence/precision of 95/10 shall be adopted in accordance with section IV, Sampling Requirements for PoAs, in “Standard for sampling and surveys for CDM project activities and Programme of Activities”, Version 3, EB 69, Annex 4.

This option of 95/10 annual sampling is therefore chosen, to cover all CPAs, in accordance with the Guidelines and conservatively satisfying requirements of the methodology.

subsystem/measures included in the CPA of a PoA is not larger than 1% of the small scale threshold defined by the methodology applied, than that CPA of PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity.

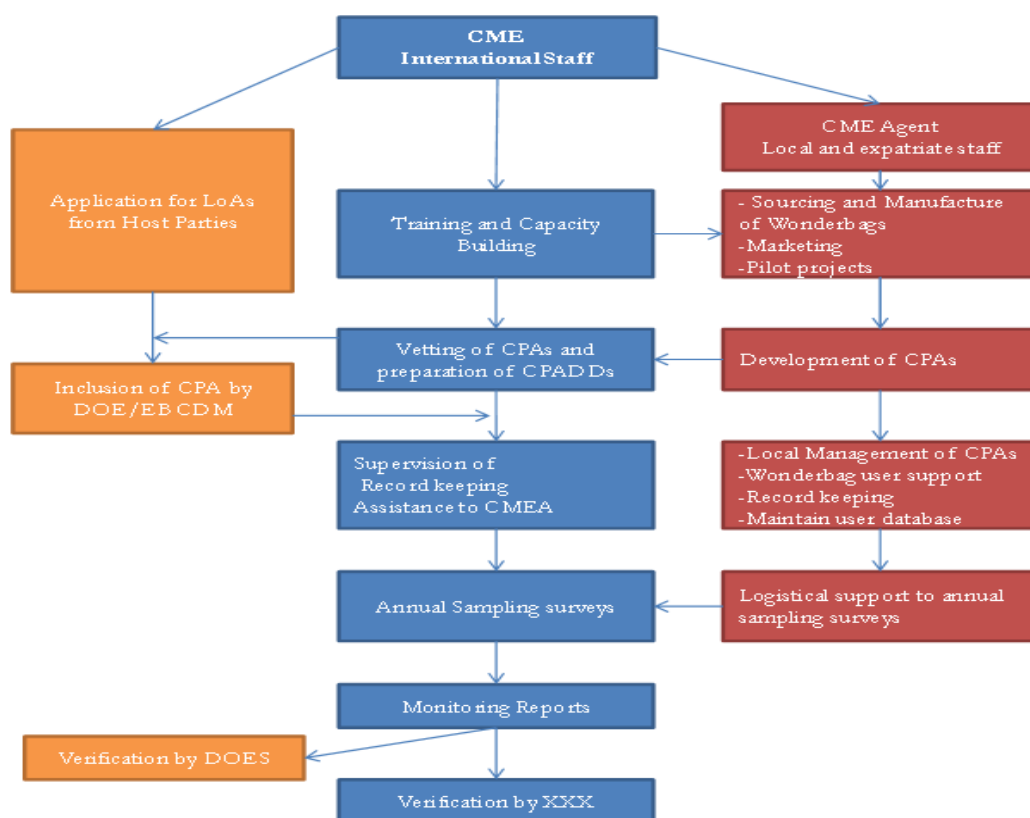
² Para 22 of AMS II.G: A statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographics differences can be used to determine parameter values used to determine emission reductions, as per the relevant requirements for sampling in the “General guidelines for sampling and surveys for small-scale CDM project activities”. When biennial inspection is chosen a 95% confidence interval and a 5% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/5 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/5 precision.

The methodology paragraph 22 states that: “In cases where survey results indicate that 90/10 precision or 95/5 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/5 precision.” This approach is adopted as a backstop, to allow for instances where the confidence/precision target is not achieved, for example if increases in sample size are prevented by practical constraints.

SECTION C. Management system

The CME has developed and implemented a management system as outlined in the diagram below. The key documentation is the contractual agreement between the CME and the CME Agent (CMEA), a party which manages a set of CPAs on behalf of the CME. This document ensures that the CMEA is aware that it is subscribed to the PoA and acts in compliance with the PoADD.

The programme is operational in countries for which the Host Party has signed a LoA. In each such country, there is in general one CME Agent, although the management system allows the possibility of multiple CMEAs in one country, and for a single CMEA to operate in more than one country.



The CME and the CMEA have roles and responsibilities as outlined in the diagram, in the following table, and in the text below which follows the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, version 02.1 (EB 70, Annex 5):

Entity	Roles and responsibilities
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CME	<ul style="list-style-type: none">• Focal point for communications with DOEs, the CDM EB, and Host Parties• Deployment of senior level staff with experience of international project management and CDM procedures, with competencies for effectiveness in the roles listed here• Training, capacity-building, technical support to Wonderbag manufacturers and CMEAs• Assistance to CMEAs with respect to development of new CPAs• Vetting of CMEAs and new CPAs to eliminate risk of double-counting and ensure compliance with eligibility requirements• Direct supervision and control of all CMEA operations and all CPA operations, including control of documentation and serial numbers. Documentation to include assertion of ownership of carbon credits by CME• Technical support, operational guidelines, for local distributors (CMEAs)• Oversight of record-keeping by manufacturers and CMEAs• Commissioning of annual monitoring sampling surveys• Quality control and supervision of record-keeping such as Wonderbag User DataBase (WD)• Annual reports summarising user records together with results of annual monitoring surveys, for submission to verifying DOE.• Adoption of CMEA role in cases where CMEA is not operational• Continuous improvement of PoA management system
CMEA	<ul style="list-style-type: none">• Promotional distribution, pilot projects, marketing, sales, operations to develop new CPAs• Local management of CPAs• On-going support users to ensure proper use of Wonderbags• Maintenance of Wonderbag User Database (WD)• Registration of representative pool of Wonderbag users within WD• As required, establishment of local manufacturing capacity, manufacturing, import of components, and co-ordination of materials supply and component out-sourcing• Issuance and servicing of user registration paperwork (and/or warranty cards and user agreements as applicable), and servicing of material recycling policies• Maintenance of records of all transactions and operations to facilitate tracking and quality assurance, data authentication, elimination of double-counting risks, cross-checks by auditors

(a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

As described in the table above the CME will manage the process of CPA inclusion. This will include deployment of senior level staff with experience of international project management and CDM procedures, with suitable competencies. These staff should include:

CME Manager

The CME manager is responsible for the strategic management of the CME. This senior position requires appropriate management training, many years of experience in project management, in-depth CDM knowledge and experience in developing countries.

CPA Inclusion Manager

The CPA Inclusion Manager is a senior level position requiring a broad background in business management. The person will need a good knowledge of CDM procedures and carbon finance, and must be competent in all aspects of the CME's operations.

Monitoring Manager

The Monitoring Manager is a senior level position. The role requires excellent organisational, analytical and communication skills to ensure the compliance of CMEAs with their obligations that will result in successful verifications of CPAs' emission reductions.

(b) Records of arrangements for training and capacity development for personnel;

CME staff will be provided with training organised in-house or by external consultants as appropriate. The CME will provide training to the staff of the CMEA who are responsible for the operation of the CPAs to ensure their ability to comply with all aspects of the PoA's requirements.

(c) A procedure for technical review of inclusion of CPAs;

The CME team will first review a potential CPA including the potential CMEA. On successful completion of this due diligence exercise a contractual agreement will then be put in place between the CME and CMEA to develop a CPA. This agreement will carefully document the way in which the CME will work with the CMEAs, setting out both CDM and PoA requirements.

The CME along with the CMEA will then ensure that the proposed CPA meets all the relevant eligibility criteria, as outlined in the PoA-DD, with the approved methodology, the baseline, additionality, double counting avoidance and de-bundling. It will also ensure that the CPA complies with all the regulatory requirements of the host country. The CME will then submit the CPA for inclusion and will respond to any issues raised by the DOE.

(d) A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA);

Double counting will be avoided as each Wonderbag will have a unique serial number entered into the Wonderbag User Database (WD). The WD will be used for double accounting checks. The unique serial number will avoid the same Wonderbag being counted twice in different CPAs in the PoA.

(e) Records and documentation control process for each CPA under the PoA;

To identify each Wonderbag under the PoA, all Wonderbags sold will have a unique serial number that will be recorded at the moment of purchase. CMEA's will enter the data into a database that will be continuously monitored by the CME. Each CPA will have a unique identification code and each CMEA database will be added to a central CME database regularly.

(f) Measures for continuous improvements of the PoA management system;

The CME will periodically review the management system of the PoA to ensure that there is a continuous improvement in its efficiency.

(g) Any other relevant elements.

Not applicable

SECTION D. Duration of PoA**D.1. Start date of PoA**

27/02/2012, the date of commencement of validation process as marked by start of the Global Stakeholder Process.

D.2. Length of the PoA

28 years

SECTION E. Environmental impacts**E.1. Level at which environmental analysis is undertaken**

Environmental Analysis is done at PoA level. This option is selected in view of the requirement for a LoA in each country of the PoA, for the following reasons:

- (a) LoAs performing the appropriate assessment of environmental and sustainable development impact at national level in each country of the PoA. Each LoA issued will serve to demonstrate an environmental analysis appropriate for each Host Country.
- (b) The interaction between technology and the local environment in which it is used, is the same in each country and each CPA.

E.2. Analysis of the environmental impacts

The PoA is designed to reduce the use of NRB and hence deforestation and poses no environmental threat. The thermal insulation materials (polyurethane foam or expanded polystyrene) are long-lasting and re-usable continuously in Wonderbags as well as having general commercial value. The CPAs under the POAs will include arrangements for recovery of these materials. For example in Rwanda the CMEAs are obliged to provide cash payments to ensure full recovery and recycling. The materials are ecologically harmless, and contain no CFCs; EPS is fully recyclable by grinding it down to produce new EPS and can be used as a lightweight aggregate for concrete and insulating mortars; thus the project applies the precautionary principle.

An analysis of environmental impacts is contained below:

- Greenhouse gas (GHG) emissions are reduced.
- Deforestation is reduced by decreasing the demand for wood-fuel.
- Local air pollution (in particular indoor air pollution) is reduced along with its many negative health impacts.
- Any waste from manufacturing of the Wonderbags is not environmentally harmful and will be managed according to appropriate local/national legislation.
- By reducing deforestation biodiversity loss is reduced.
- There are no anticipated trans-boundary impacts beyond the reduction of GHG emissions.

SECTION F. Local stakeholder comments**F.1. Solicitation of comments from local stakeholders**

Stakeholder consultation is carried out at PoA level. This option is selected because the social and economic impact of the project is the same through all CPAs throughout Rwanda, and because the CPAs are country-wide. It is also the case that LoA assessment includes assessment of adequate stakeholder consultation.

Comments from the local stakeholders were invited through by the following means:

- Public invitation to a consultation meeting
- Public meeting following consultative agenda and including break-out groups led by moderators skilled in eliciting independent judgements from participants, and including practical demonstrations of Wonderbag use
- Individual consultations with stakeholders in their homes, kitchens, and places of business, linked to practical use of Wonderbags

Comments were received and compiled as follows:

- a) A formal stakeholder consultation meeting took place on 22 November 2011 in Rwanda, at the Nelson Mandela Peace Village Community Hall. Government officials, the public, and local householders were invited to the meeting. In the event 350 participants were registered. The meeting was conducted entirely in Kinyarwanda language, and included presentation by Powerpoint of the proposed project design, demonstration of the project technology, and plenary speeches by several stakeholders. The participants were divided into several break-out groups, in order to elicit contributions from individuals. Each group was led by a professional acting as facilitator, and comments were taken down in writing. Subsequently the full set of elicited comments were presented in plenary session.
- b) On 23 November 2011, a set of interviews with stakeholders were conducted in the homes of families who had adopted a Wonderbag in Rwanda during the preceding trial period of between 6 and 24 months, in order to elicit comments relevant to the project design. Comments were noted in writing by a multi-lingual translator, and photographs taken of the stakeholders involved.

The comments noted in both sessions were compiled together into a stakeholder meeting report, which is available as a supporting document.

F.2. Summary of comments received

The following short-list of comments are derived from the full stakeholder meeting report:

Source	Comment
Claudine Uwineza, Vice Mayor Kamonyi District	I am concerned to find funding for making the price affordable, or to pay for free distribution, for the poor people in my district. The carbon finance will be essential in this way. I have seen poor families use the Wonderbag in the pilot trials and it is clear to me that even if the bag is given free, they will still use it every day. They are telling me they are paying half as much for fuel, and it is helping them eat well and feed their children well while they can also work more easily. I will support this project fully in my district.
Emile Gasirabo, Chief of Nelson	Many women in my village have used Wonderbags in the pilot



Mandela Peace village	trials for almost a year They are very happy using the bag every day and all the other women want to have a bag also. I think there should be at least two for each family, 3 bags per family would be best.
Rukundo Julius, Vice-Mayor Bugesera District	This product is very important because it saves family money, and it helps families cook in a clean way and there is much less smoke causing suffering, and it protects the environment, it means less trees are cut for firewood and charcoal. I will support this project fully in my district.
Ngalula Dany. Householder, mother and cook	I put beans in the Wonderbag and then I can move around and not worry. I used to heat up the food before the family meal now I don't need to light the stove again. Actually the food is all delicious now, and before I often didn't like many things. The food is hot for 24 hours if you don't open the Wonderbag. I am learning so much about cooking now with the Wonderbag, it's wonderful. We used 4 to 5 bags of charcoal before, now we use only 2. When the kids are home and we get home from work, we can all eat a delicious meal together.
Alex Bienvenue, husband of Ngalula Dany.	The project should help Rwandans to make the Wonderbag locally. How will the project ensure that enough insulation material can be imported to satisfy the market here? Could the project find an alternative insulation material which we can find locally? We can make the cloth here ourselves because we have a textile mill. We can maybe distribute as many as a million bags, because once it catches on people will all want to have 3 in each home, and we have 2 million homes.
Contribution from break-out group	The Wonderbag should be very easy to buy for families who have no money. Perhaps you can use the Umerenge Sacco, because this local co-operative system works like a bank, rotating very small loans in small groups in the villages.
Contribution from break-out group	You can encourage more people to start using it by spreading awareness through church meetings, and seminars like this one.
Contribution from break-out group	Existing users could lend out their Wonderbag, so their neighbours can try it for a while and see how it works. Or perhaps the project can lend out for a short time.
Contribution from break-out group	You could make larger Wonderbags for schools and hospitals. They use very big pots. Also restaurants. It's good for us to protect our wood resources, if the big kitchens use less wood and charcoal.
Mukamuseni Josephine. Grandmother, householder and cook	I have a round pot to fit my wood fire. It's difficult for me to put it in the Wonderbag so I pour the food into another pot and then use the Wonderbag. My grandchildren and daughter eat hot food when they come back from school and work. With only one arm I cannot easily cook for them so they help me in the morning to use the Wonderbag before they go, and the food is ready to eat when they come back.
Nikuze Veneranda, cook and housekeeper. Has used the Wonderbag for several months.	I use two wonderbags, one big one and one small one. I cook around 11am. I start the food on the charcoal stove in the kitchen then put it in wonderbags so that it can cook slowly. I carry it to near the house for the family to eat in the evening when they

	come home.
Mukamutebe Bernadette, Sector Community Health and Environment Supervisor, Kamonyi District.	I recommend each family needs 3 Wonderbags. It helps their lives a lot. I know this from my own experience at home so far using just one Wonderbag. I have children and I need two of the standard size ones and also one bigger one. Just with one, I use much less charcoal than before.
Mukagatera Ernestine. Cook and daughter of householder.	I sometimes cook twice a day, using wood. The food is hot still in the morning for breakfast. My pot is black from the wood smoke so I clean it before putting it in the Wonderbag to keep the Wonderbag clean. I would like to have two Wonderbags.
Mukandoli Patricie, mother and householder, farmer.	With the Wonderbag I don't need to worry because I put the food in and go to cultivate my field, then come back and its cooked. I use the Wonderbag twice a day and use much less firewood and charcoal than before. The firewood is so hard to collect, there is so little to find now, I started to use charcoal sometimes because of this difficulty. With the Wonderbag it makes collecting firewood much easier. When I use firewood I cook in the kitchen here behind me but with the charcoal stove I cook outside.

F.3. Report on consideration of comments received

In response to the comments received, NBI is taking the following steps:

- The feasibility of local manufacture has been studied in response to stakeholder comment in this respect, and a project proposal has been drawn up with a view to production starting in August 2012.
- NBI has investigated the potential for alternative insulation materials, in response to a comment in this respect. Test have been conducted on Polyurethane (PU) foam as an alternative to EPS, which proved to be a better choice for logistic and supply reasons facilitating local manufacture and easier transport.
- Distribution methods under consideration include the option of encouraging trial-use periods amongst neighbours, as suggested by one stakeholder.

SECTION G. Approval and authorization

A Letter of Approval from the Government of Rwanda is provided in support of this PoA-DD. This letter recognizes and authorises NBI to act as the CME of this program. The programme will expand into further countries on the basis of further LoAs.

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

This generic component project activity (CPA) aims to establish regular use of Heat Retention Cookers (HRCs), with the trade name Wonderbag, in domestic and non-domestic kitchens included within the CPA.

The predominant cooking fuels in the CPA are firewood and wood-charcoal. The CPA reduces the usage of these fuels in domestic kitchens. These firewood and wood-charcoal resources are currently non-renewing, so their combustion results in green-house gas emissions into the atmosphere. By virtue of reduction in cooking fuel usage, the HRCs decrease green-house gas emissions.

The Wonderbag (WB) is a thermally insulated bag into which a cook transfers a pot heated on a stove. The food in the pot continues to cook inside the Wonderbag, while the stove is no longer in use, so conserving fuel.

The Wonderbag (WB) has important benefits supplementary to reduction of green-house gas emissions. Its use reduces smoke in the kitchen and therefore smoke-related disease, it introduces new employment, and it saves cash expenditure on cooking fuel, as well as releasing time for productive activities therefore improving livelihoods. Pilot trails show the WB to be popular also because it adds significant convenience to household management; it allows most of the cooking operation to be done safely without the stove being lit, so decreasing incidence of domestic accidents linked to open flames. It reduces the need to stir, as the direct heat source causing burning is removed. Furthermore, the food in a WB stays hot for a long period so meal-times are flexible and tasks outside the kitchen or away from the home can be accomplished more easily during the cooking process, as supervision of the stove is not needed. Child care can take place safely away from the kitchen or safely within the kitchen with the stove unlit, while cooking is underway. Manufacture and distribution of the WB in-country, creates many new jobs in areas where employment creation is a development priority.

SECTION B. Application of a baseline and monitoring methodology

B.1. Reference of the approved baseline and monitoring methodology(ies) selected

The selected small scale approved baseline and monitoring methodology is:

AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass”, Version 3, EB 60, Annex 21.

UNFCCC website link:

<http://cdm.unfccc.int/methodologies/DB/6U8JYO9XTLVZ8LJ7GUBSZP145BIDG2>

The methodology refers to the following standards, guidelines and tools:

- Standard for the demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities, Version 01.0 (EB 65 Report, Annex 3).
- Standard for sampling and surveys for CDM project activities and programme of activities, Version 03 (EB 69, Annex 4)
- Guidelines on the demonstration of additionality of small-scale project activities, Version 09.0 (EB68 Annex27)
- General guidelines for SSC CDM methodologies, Version 18.0 (EB 66, Annex 23)

This approved baseline and monitoring methodology, AMS-II.G v3, is applicable to CPAs under the PoA as per the PoA rules.

B.2. Application of methodology(ies)

Applicability Requirement of AMS-II.G, Version 03	CPAs under the PoA	Is the applicability condition met?
--	---------------------------	--



This category comprises appliances involving the efficiency improvements in the thermal applications of non-renewable biomass.	The methodology applies to project systems or appliances involving efficiency improvements in thermal applications of non-renewable biomass. The Wonderbag improves the efficiency of the principal thermal application of non-renewable biomass in developing countries, which is combustion for cooking.	Yes
Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics	Supporting documentation is provided, in the form of published literature, official reports or statistics, which indicates that non-renewable biomass has been used since 31 December 1989, using published literature, official reports or statistics.	Yes
Project participants shall apply the general guidelines to SSC CDM methodologies, information on additionality and general guidance on leakage in biomass project activities (attachment C to Appendix B) provided at < http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html >	On average each Wonderbag used over one year saves considerably less than 1.8 GWh, which is 1% of the energy limit for Type II projects using small-scale methodologies. Leakage provisions are addressed in compliance with the methodology and additionality is addressed in compliance paragraph 2.c of Annex 27 of EB 68.	Yes

B.3. Sources and GHGs

As per the methodology, the CPA boundary is the physical, geographical sites of cooking undertaken with Wonderbags in order to improve efficiency of thermal application of non-renewable biomass, which in practice means the kitchens in which Wonderbags are used. The CPA boundary is the sum of kitchens using the Wonderbag.

Source		Gas	Included?	Justification / Explanation
Baseline	Combustion of non-renewable biomass for cooking in kitchens not using the Wonderbag. Emission Factor for combustion of fossil fuels for cooking.	CO ₂	Yes	Major source of emissions
		CH ₄	No	Not included in respect of AMSIIG
		N ₂ O	No	Not included in respect of AMSIIG
Project activity	Combustion of non-renewable biomass for cooking in kitchens using the Wonderbag. Emission Factor for combustion of fossil fuels for cooking.	CO ₂	Yes	Major source of emissions
		CH ₄	No	Not included in respect of AMSIIG
		N ₂ O	No	Not included in respect of AMSIIG

B.4. Description of baseline scenario

According to the methodology applied, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

B.5. Demonstration of eligibility for a generic CPA

This CPA meets all the eligibility criteria of the PoA as demonstrated by the confirmation of each criterion listed in the table below:

Criteria	Characteristics of the generic CPA	Confirmation of eligibility
(a) The Wonderbags included in the CPA will be distributed within the geographical boundary as specified in section A.5 of this POA.	CPA implementation arrangements apply exclusively to distribution within the geographical boundaries defined in Section A.5.	Yes
(b) Double counting of emission reductions shall be prevented in each CPA through an effective Wonderbag identification system	CPAs have an identification system consisting of labelling each Wonderbag with a Wonderbag logo and serial number which is represented on the Wonderbag User Database.	Yes
(c) Each CPA shall specify the level and type of service of the Wonderbags, and provide performance specifications in compliance with suitable sampling survey protocols;	CPAs disseminate Wonderbags which comply with the technical description and minimum specifications defined in Section A6 of the PoA-DD.	Yes
(d) The CPA shall have a start date of 01/03/ 2012, this being subsequent to start of the GSC,	CPAs are collectively characterized by supporting documents which include (a) financing agreements on which the project launch was contingent, dated prior to	Yes



or date of first adoption of a Wonderbag, whichever is later.	this date and (b) distribution database (Wonderbag user Database) which demonstrates that all Wonderbag adoptions take place after this date.	
(e) The CPADD shall comply with the applicability and other requirements of the applicable methodology AMS II.G v3	CPAs compliant with eligibility criteria (c), (k) and (n) are compliant with the methodology AMS II.G v3 as collectively detailed in the PoADD and the supporting excel calculations.	Yes
(f) The circumstances of the CPA are such that it could not occur without the POA being in place.	<p>The CPA will demonstrate the following conditions in order to confirm that it could not occur without the PoA being in place::</p> <ol style="list-style-type: none"> 1. The CPA limits user distribution to households, communities or Small and Medium Enterprises (SMEs) as per paragraph 2.c of Annex 27 of EB 68 2. The technology deployed in the CPA complies with the specification of section A.6. of the POADD. This confirms the physical dimensions of the Wonderbags and therefore their maximum energy saving capacity. 3. Each Wonderbag user will save less than 9GWhth /year representing 5% of the small-scale threshold as per paragraph 2.c of Annex 27 of EB 68. 	Yes
(g) Local stakeholder consultations and environmental impact analysis is undertaken at PoA level and therefore this criterion is not applicable.	Not applicable as local stakeholder consultation and environmental impact analysis is undertaken at PoA level.	Yes
(h) No funding from Annex I parties, if any, results in a diversion of official development assistance;	The CPA implementer will confirm that there is no funding from Annex I parties. In case there is funding from Annex I parties the Annex I party will confirm that this does not result in a diversion of official development assistance.	Yes
(i) The target group(s) of the CPA are one, or more than one, of the following: Households, communities or SMEs using wood-fuel for cooking	The CPAs are consistent with the target groups defined by the PoADD, namely households, communities or SMEs using wood-fuel (fire-wood and wood-charcoal) for cooking. . This is demonstrated in the CPA-DD monitoring plan.	Yes
(j) The CPA monitoring plan shall include sampling and survey approaches consistent with the relevant standard from the Board and the applied methodology	The CPAs concur with the applicable methodology AMS II.G v3 and the “ <i>Standard for sampling and surveys for CDM project activities and Programme of Activities</i> ”, Version 3 (EB 69, Annex 4) and reflect the sampling plan as described on PoA level.	Yes
(k) The CPA shall in aggregate meet the small-scale threshold	The CPAs save less than 180 GWhrs _{thermal} /year in aggregate, in all years of the crediting period as will be	Yes

criteria of 180GWH _{th} / year and shall remain within that threshold throughout the crediting period of the CPA;	demonstrated in the Wonderbag User Database (WD).	
(l) The individual devices disseminated by the CPA have an energy saving which complies with the approved Guidelines on assessment of debundling for SSC project activities	Each individual device disseminated by the CPAs has an energy saving which is less than 1% of the threshold specified for the CPA ³ which is 1.8 GWh _{thermal} /year as demonstrated by calculations.	Yes
(m) The CPA is located in a country classified by the UN as a LDC), where biomass cooking fuel is not 100% demonstrably renewable, and where there exist indicators of NRB	<p>The CPA is located in a LDC and</p> <ul style="list-style-type: none"> DRB as defined by the applied methodology is not 100% Evidence exists of at least two of the following indicators of NRB (a) increased time spent or distance travelled for gathering fuel-wood, (b) information on depletion of carbon stocks, (c) increasing price of fuel-wood, (d) trends in types of cooking fuel used, indicating scarcity of woody biomass. Rwanda demonstrates at least two of these indicators. Evidence shall also be provided that the trends identified are not occurring due to the enforcement of local/national regulations. 	Yes
(n) Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics	CPAs are all in countries where non-renewable biomass has been used since 31 December 1989 as will be demonstrated in the CPA-DD..	Yes

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

The emission reductions achieved by the CPA will be calculated in compliance with AMS-ILG v3 as follows:

$$ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected\ fossilfuel} \quad (1)$$

Where:

³ In compliance with the “Guidelines on assessment of debundling for SSC project activities, v03 (EB 54, Annex 13, par.10) for determining the occurrence of debundling under a Programme of Activities (PoA)”, if each of the independent subsystem/measures included in the CPA of a PoA is not larger than 1% of the small scale threshold defined by the methodology applied, than that CPA of PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity.

ER_y	Emission reductions during the year y in tCO ₂ e
$B_{y,savings}$	Quantity of woody biomass that is saved by the CPA in period y in tonnes, as calculated by equation (2) below
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in period y that is non-renewing.
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\ fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO ₂ /TJ ⁴ . (Note that it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs, as stated in Paragraph 4 of the methodology).

The quantity of woody biomass that is saved by each stove ($B_{y,savings}$) is estimated using Paragraph 6, Option 1 of the methodology, by application of a Kitchen Performance Test (KPT).

The baseline evaluation follows Paragraph 7, option (a), which specifies measurement by survey, which is the KPT. This establishes ex-ante the value of B_{old} .

The further parameters required by the methodology for calculation of emission reductions, in terms of choices taken as to options in the methodology, are:

Paragraph 13, which addresses leakage in respect of rebound in use of non-renewable biomass. The choice is made to adopt the default factor of 0.95 for adjustment of B_{old} . The abbreviation L_{NRB} is used in Eqn (2) for this parameter.

Paragraph 16: *Monitoring shall also consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to determine if they are still operating or are replaced by an equivalent in service appliance.*

This paragraph requires that the fraction of Wonderbags which have been distributed but which are not used, is ascertained. This fraction may be labelled the Drop-Off Fraction or “DOF”. It is included in the Eqn (2).

Paragraph 17: *If the quantity of fuel saved is determined using the Kitchen Performance Test (i.e. paragraph 6, Option 1), monitoring shall ensure that fuel consumption during the period of the project activity is monitored annually.*

The difference ($B_{old} - B_{y,new}$) is therefore measured by the KPT each year. It is included in the equation (2) below.

⁴ This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50% weight is assigned to coal as the alternative solid fossil fuel (96 tCO₂/TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 tCO₂/TJ for Kerosene and 63.0 tCO₂/TJ for Liquefied Petroleum Gas (LPG)).

Para 20: *Monitoring shall ensure that:*

- (a) *Either the replaced low efficiency appliances are disposed of and not used within the boundary or within the region; or*
- (b) *If baseline stoves continue to be used, monitoring shall ensure that the fuel-wood consumption of those stoves is excluded from B_{old} .*

This is complied with by virtue of the application of Option 1 Paragraph 6, option 1. This is because the KPT measures all fuel used by all stoves in the baseline in the kitchen, and not the fuel used by a single stove in the kitchen.

Paragraph 23, which addresses leakage in respect of PoAs. The following option is chosen: *As an alternative to subparagraphs (a) and (b), B_{old} can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.*

Accordingly, the default value of 0.95 is used to adjust B_{old} . The abbreviation L_{POA} is used in Eqn (2) for this parameter.

$$B_{y,savings} = (B_{old} * L_{NRB} * L_{POA} - B_{y,new}) * N_y * (1-DOF_y) \quad (2)$$

Where:

B_{old}	Quantity of woody biomass used in the absence of the project activity in tonnes. B_{old} is derived from a survey of local usage (Paragraph 7, option a, which is the KPT).
$B_{y,new}$	Annual quantity of woody biomass used during the project activity in tonnes, measured as per the Kitchen Performance Test (KPT) protocol (Paragraph 6, Option 1). The KPT is carried out in accordance with national standards if available or international standards or guidelines.
N_y	The number of users of Wonderbags in year y. This number is required by Paragraph 7, option a, and Paragraph 6, Option 1, in order that the KPT findings on average fuel consumption per baseline system and per project fuel saving, can be converted to total baseline and total project fuel consumption. A user is a kitchen using one or more Wonderbags.
L_{NRB}	Leakage adjustment as per Paragraph 13(a), default value 0.95.
L_{POA}	Leakage adjustment as per Paragraph 23(c), default value 0.95.
DOF_y	The fraction of Wonderbags which have been distributed but which are not used, as required by Paragraph 16. The value of this parameter will be found by annual sampling.

B.6.2. Data and parameters that are to be reported ex-ante



Data / Parameter	L_{NRB}
Unit	fraction
Description	Adjustment for NRB Leakage
Source of data	AMS-II.G V3
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	AMS II.G V3 provides a default value in paragraph 13. This factor is adopted.
Purpose of data	Calculation of leakage
Additional comment	

Data / Parameter	L_{POA}
Unit	fraction
Description	Adjustment for PoA Leakage
Source of data	AMS-II.G V3
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	AMS II.G V3 provides a default value in paragraph 23. This factor is adopted.
Purpose of data	Calculation of leakage
Additional comment	

Data / Parameter	$EF_{projected_fossilfuel}$
Unit	tCO ₂ /TJ
Description	Emission factor for non-renewable biomass
Source of data	AMS-II.G V3
Value(s) applied	81.6
Choice of data or Measurement methods and procedures	AMS II.G V3 provides a default value. This factor is adopted.
Purpose of data	Calculation of project and baseline emissions
Additional comment	

Data / Parameter	<i>B_{old}</i>
Unit	tonnes
Description	Quantity of woody biomass consumed in a kitchen not using a Wonderbag
Source of data	Pre-validation KPT (April-May 2012)
Value(s) applied	3.23 tonnes/kitchen/year
Choice of data or Measurement methods and procedures	<p>Internationally recognized KPT protocol (see section B.7.2 Monitoring Plan)</p> <p>The survey satisfied the confidence/precision requirements set out by EB 65 Annex 2: Standard for sampling and surveys for CDM project activities and programme of activities (Version 03.0). A precision better than 10% was achieved at a confidence level of 95%.</p> <p>To convert from charcoal to woody biomass in cases where charcoal was used the value of 6 was applied as per the IPCC Guidelines.⁵</p>
Purpose of data	Calculation of baseline emissions
Additional comments	

Data / Parameter	<i>NCV_{biomass}</i>
Unit	TJ/tonne
Description	Net calorific value of non-renewable woody biomass
Source of data	AMS-II.G V3
Value(s) applied	0.015
Choice of data or Measurement methods and procedures	AMS II.G V3 Paragraph 5 provides this IPCC default value for non-renewable woody biomass
Purpose of data	Calculation of project and baseline emissions
Additional comment	

⁵ <http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf>, .Page 1.45



Data / Parameter	$f_{NRB,y}$
Unit	fraction
Description	Fraction of woody biomass saved by the project activity in period y that is non-renewing
Source of data	Official literature, surveys and published studies as detailed under measurement methods and procedures below

Value(s) applied	0.98
Choice of data or Measurement methods and procedures	<p>The more conservative value following two alternative assessment methods has been selected. The two methods applied are: (a) following the CDM default value as listed (http://cdm.unfccc.int/DNA/fNRB/index.html). (b) the three-step calculation method required by the methodology (which requires reference to national studies):</p> <ol style="list-style-type: none"> DRB=0. The methodology requires identification of areas of demonstrably managed wood-fuel reserves in the country, labeled DRB. These are areas where sustainable management is practiced such that carbon stocks do not decrease, and national or regional forestry, agriculture and nature conservation regulations are complied with. The following studies concerned with wood-fuel resources in Rwanda, state that policies devised to promote management and protection of wood-fuel resources are ineffective (due to intense population pressure and demand for wood-fuel for which there is no alternative). There is therefore no demonstrably renewable biomass in Rwanda and DRB = 0: <ul style="list-style-type: none"> MINISTRY OF FORESTRY AND MINES NATIONAL FORESTRY AUTHORITY (NAFA) Strategic Plan for the Forest Sector 2009 – 2012, Kigali, June 2010, section 1.5.1,4⁶. Rwanda Environmental Threats and Opportunities, Assessment (ETOA) 2008 Update, page 43⁷ CASE Project Baseline Report, CARE, 2008. page 51⁸ Indicators of NRB. The methodology requires evidence of at least two of the following indicators of deforestation (a) increased time spent or distance travelled for gathering fuel-wood, (b) information on depletion of carbon stocks, (c) increasing price of fuel-wood, (d) trends in types of cooking fuel used, indicating scarcity of woody biomass. All the countries within the scope of this PoA demonstrate at least two of these indicators. In the case of Rwanda: <ul style="list-style-type: none"> Evidence of depleting carbon stocks⁹ Evidence of rising prices¹⁰ Therefore, given that $fNRB = NRB / (NRB + DRB)$ and $DRB = 0$, $fNRB = 1/1 = 1$

⁶ “Lack of standard forest management practices: No forest in the country is managed with a proper management plan (inadequate or absence of silvicultural operations) which leads to highly reduced quality and quantity of forest products”. 9. “Poor forest extension services: The forest extension services are inadequate being understaffed and ill equipped. 12. Lack of skilled human resources: The forestry sector is under staffed, with only 27 forestry professionals out of about 150 foresters needed in the country (MINIFOM, 2010).”

⁷ “even though fuel wood is a monetized resource, there is no cohesive plan for maintaining or improving stocks”

⁸ “The collection of firewood is not controlled and this leads to destruction of young tree and forests..... most of charcoal producers work clandestinely. This leads to young tree cutting and usage of non-appropriate techniques...”

⁹ Several recent studies provide this evidence, for example (a) WISDOM Rwanda FAO 2011 which states “The national supply/demand balance [of woody biomass], according to current situation shows an annual deficit of 1.8 Mt. With improved management and conversion efficiencies, the balance could raise to a deficit of “only” 0.75 Mt” (b) Fuelwood demand and

Purpose of data	Calculation of project and baseline emissions
Additional comments	The value of 0.98 applies to all CPAs in the country of the first CPA, Rwanda. CPAs in other countries will adopt the appropriate ex-ante value for their circumstances.

B.6.3. Ex-ante calculations of emission reductions

The equation for calculation of emission reductions is set out above in Part II Section B.6.1 as follows:

$$ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} \quad (1)$$

Where:

$$B_{y,savings} = (B_{old} * L_{NRB} * L_{POA} - B_{y,new}) * N_y * (1 - DOF_y) \quad (2)$$

Merging of the two equations gives a complete expression for emission reductions:

$$ER_y = (B_{old} * L_{NRB} * L_{POA} - B_{y,new}) * N_y * (1 - DOF_y) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} \quad (3)$$

By removal of N_y , his equation may also be expressed as the emission reduction per user on average, taking into account average drop-off:

$$ER_y \text{ per user on average (taking into account average drop-off)} \\ = (B_{old} * L_{NRB} * L_{POA} - B_{y,new}) * (1 - DOF_y) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} \quad (4)$$

Equations 3 and 4 are resolved using the values shown for the parameters fixed at validation in table B.6.2 above, and the monitored values, estimated or projected with the values shown in Section B.7.1 below. The pre-validation survey determined the value of B_{old} and estimated the value of $B_{y,new}$, by sampling of a pilot project population in conformance with the “Standard for sampling and surveys for CDM project activities and programme of activities” in respect of pre-validation estimation based on pilot users. The value of n_i is set to the number of Wonderbags expected to be in use in a typical year of a typical CPA in the programme, and the value of DOF is estimated¹¹:

Eqn 3:

$$ER_y = (3.23 * 0.95 * 0.95 - 1.36) * 27,178 * (1 - 0.15) * 0.98 * 0.015 * 81.6 = 43,092 \text{ tonnes per year}$$

Eqn 4:

$$ER_y \text{ per user} = (3.23 * 0.95 * 0.95 - 1.36) * (1 - 0.15) * 0.98 * 0.015 * 81.6 = 1.59 \text{ tonnes per user per year}$$

supply in Rwanda and the role of agroforestry, J. D. Ndayambaje • G. M. J. Mohren Agroforest Syst, 2011, which states that “the annual deforestation rate declined from 2.9% between 1960 and 1970 (FAO 2005) to 1.8% between 1990 and 2010”.

¹⁰ Biomass Energy Strategy, Ministry of Infrastructure, 2009. Vol 2. Section 3.4, Fig 6, shows wood-charcoal price doubling from 2003 to 2010; in the case of firewood the CASE Project Baseline Report, CARE, 2008 p. 43 states “...in the past, firewood was considered as a “free” good which is available in random supply. But now firewood is like any other source of energy which is economically costly”.

¹¹ Pilot dissemination in the pre-validation period indicates that a DOF value of 15% is a reasonable estimate.

In practice the calculation of emission reductions must accommodate the different lengths of time each Wonderbag is used within a specific monitoring period. For example, if the monitoring period is 1/1/2014 to 31/12/2014, one Wonderbag may be adopted on 1/1/2014 and another on 1/12/2014. The number of days the former is on record is 365, and the number of days the latter is on record is 31. The emission reductions during the monitored period are a combination of the longer usage period and the shorter usage period.

To accommodate this, equation 4 is adjusted to become a daily factor for emission reductions, simply by dividing by 365:

ER per user per day on average (taking into account drop-off)

$$= (1/365) * (B_{old} * L_{NRB} * L_{POA} - B_{y,new}) * (1 - DOF_y) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} \quad (5)$$

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

Data / Parameter	N_y
Unit	
Description	Number of users of Wonderbags
Source of data	Wonderbag User Database (WD)
Value(s) applied	To be projected for each crediting year in the specific CPADD during inclusion of CPA. It may be estimated that the number of users each year recorded on the User Database as having received or bought a Wonderbag, is 27,178, indicating that the value will be in this order.
Measurement methods and procedures	The WD records all Wonderbags distributed, and includes a representative portion of names, locations, addresses, and phone numbers of users. It includes users of all types, including those cooking with firewood and charcoal, for domestic or non-domestic purposes
Monitoring frequency	Continuous
QA/QC procedures	The CME oversees accurate maintenance and up-dating of the WD and provides cross-correlation checks based on records of production and shipping, to ensure accuracy of WD. Data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
Purpose of data	Calculation of baseline and project emissions
Additional comments	The value shown here is the expected number of Wonderbags in use in a typical year in a typical CPA

Data / Parameter	$DOF_{y,y}$
Unit	%
Description	Fraction of users recorded on the Database who no longer using a Wonderbag
Source of data	Sampling survey
Value(s) applied	15%
Measurement methods and procedures	Initial sampling survey prior to KPT sampling survey (see section B.7.2 Monitoring Plan)
Monitoring frequency	Annual
QA/QC procedures	<p>Sampling and survey to be carried out according to:</p> <ul style="list-style-type: none"> -EB 69 Annex 4 : Standard for sampling and surveys for CDM project activities and programme of activities (Version 03.0) <p>Users that do not fit into the following categories will not be counted as no longer using the Wonderbag: households, communities and SMEs.</p> <p>Data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.</p>
Purpose of data	Calculation of project emissions
Additional comments	

Data / Parameter	$B_{y,new}$
Unit	tonnes
Description	Quantity of woody biomass consumed in a kitchen using a Wonderbag
Source of data	KPT
Value(s) applied	<p>A pre-validation survey (April-May 2012) concluded with an estimate as follows:</p> <p>1.36 tonnes/kitchen/year</p>
Measurement methods and procedures	<p>Internationally recognized KPT protocol (see section B.7.2 Monitoring Plan). To convert from charcoal to woody biomass in cases where charcoal is used the value of 6 will be applied as per the IPCC Guidelines.¹²</p>
Monitoring frequency	Annual KPT
QA/QC procedures	<p>Sampling and survey to be carried out according to:</p> <ul style="list-style-type: none"> -Internationally recognized KPT protocol -EB 69 Annex 4 : Standard for sampling and surveys for CDM project activities and programme of activities (Version 03.0)
Purpose of data	Calculation of project emissions
Additional comments	

¹² <http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf>, .Page 1.45

B.7.2. Description of the monitoring plan for a generic CPA

Monitoring will take place in two modes, continuous and periodic:

Continuous monitoring

A Wonderbag User Database (WD) will be kept up to date continuously. It will collect the following data items:

- Numbers of WBs distributed to users each month
- Serial number: Allocation of unique serial number for each WB listed in the WD
- Distributor: Names and phone numbers and locations of all WB distributors
- Date or month of adoption: Detail of month and year in which quantities and serial numbers of WBs distributed to end-users, from which a conservative date-of-first-use is derived. The records will indicate a conservative date of first use of all WBs, the conservative assumption being made that first use is at the end of the month in which the WB is distributed at end-user level.
- Location, district or area of each distribution activity
- Allocation of all WBs to a unique CPA
- For a representative proportion of users, record of names, addresses and phone numbers and month the Wonderbag adopted. As a non-mandatory requirement entry also of day of adoption of a Wonderbag, determined as day a user takes possession (typically in a shop) plus 3 days; such dates can be used to calculate emission reductions in place of end-of-month dates.

B Periodic Monitoring

A. Sampling Design

Objectives, Timeframe, and Reliability Requirements

The objectives are to determine annually with a 95/10 confidence/precision during the crediting period

(a) the proportion using a proportion survey, and

(b) the parameter $B_{y,new}$ using a Kitchen Performance Test protocol

This reliability level is applied so that the sampling procedure can be applied to the populations of all CPAs are combined together.

Target Population

The Target population is the full population of cooks working in kitchens of households, communities, and SMEs who are recorded on the Wonderbag Database (WD) as having adopted a Wonderbag.

Sampling method

The sampling method is simple random sampling. This is applied to both parameters:

- (a) To determine the drop-off fraction DOF, a random sample is selected from the WD. This selection of subjects are visited and requested to state whether or not they are still using the Wonderbag. The proportion of Wonderbags still operating is counted, and its inverse (1-proportion still operating) is recorded as DOF.
- (b) To determine the value of $B_{y,new}$, a random sample is selected from the WD.

Sample size

The sample sizes are determined for the two parameters as follows:

- (a) For DOF, the equation prescribed by EB69, Annex 4 Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 03.0), is applied. The proportion WBs still operating is not expected to fall below 85%, therefore the sample size is calculated on

the basis of a 85% expectation. For a reliability of 95/10 confidence/precision, the minimum sample size is calculated as 68. Non-compliance is not likely to exceed 40%, and therefore the gross sample size is calculated as 100.

- (b) For $B_{y,new}$, the equation prescribed by EB69, Annex 4 Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 03.0), is applied. The pre-validation field survey indicated a variance of 0.67, therefore for a reliability of 95/10 confidence/precision, the minimum sample size is calculated as 255. Non-compliance is not likely to exceed 20%, and therefore the gross sample size is calculated as 307.

Since the size of the gross random sample taken for (b) is larger, it may be used in whole or part first to determine a result for (a). The random sample for (b) may then be reduced in size by incidences of test subjects which have proven to be drop-offs; these are excluded from the sample for (b).

Sampling frame

The sampling frame is the listing of all Wonderbags disseminated by the project to households, communities and SMEs, as recorded in the Wonderbag Database (WD). Sampling units will be determined by the CME on an annual basis. CPAs will be grouped by host country and then maybe divided into smaller groups by CMEA or other factors at the discretion of the CME to ensure homogeneous sampling units.

B. Data collected

Field measurements

The data collected in the two surveys are as follows:

- (a) For DOF, the parameter of interest is a yes-no confirmation to the question as to whether the Wonderbag is still in use or not. This data is collected during a survey which typically takes two to accomplish. The survey is carried out during a specific monitoring period comprising 12 months starting at the end of the previous monitoring period. The survey may take place at any time during the final 6 months of the monitoring period. This ensures a conservative result, as the drop-offs that occur prior to the survey, are treated as drop-offs throughout the monitoring period with respect to emission reduction calculations. The value of DOF is not affected by seasonal changes.
- (b) For $B_{y,new}$, the variable measured is $B_{y,new}$. This data is collected during a survey which typically takes three to four weeks to accomplish. The survey is carried out during a specific monitoring period comprising 12 months starting at the end of the previous monitoring period. The survey may take place at any time during the final 6 months of the monitoring period. The value of $B_{y,new}$ is not affected by seasonal changes, although it is affected by incidences such as public holidays (this is some festivals involve families fasting and others involve families eating more than usual; weekends generally see more cooking than week-days). The KPT protocol accommodates such variations in cooking patterns in order to ensure a conservative result, for example the prescribed days chosen to run tests do not include a ratio of family-eating-at-home days which exceeds the annual average.

Quality assurance/Quality control

- (a) For DOF: To make sure that the interview questions are correctly posed and correctly answered a quality assurance technique is included in the interview design and interviewers are trained to apply the technique. The technique will be developed to make sure it achieves accurate results starting with the following protocol: first the respondent is positively identified as the person who originally adopted the Wonderbag as identified in the WD, or reliable representative or successor. Then the question is asked, “have you used the Wonderbag in recent weeks”, followed by the question “are you intending to use it in future weeks”. The survey is conducted by site

visit, and interviewers will be trained in effective communication. Users who clearly do not use their Wonderbag but can give the details of a successor user, will have their names replaced by the successor user on the WD and the successor user will take their place as a subject for this survey. Users who give a clear response that they are not using the Wonderbag anymore and it is not in the hands of another user, will be recorded as not-using, or a “NO” parameter value. Users fully identified giving a clear affirmative response to both of the two successive questions about usage, will be recorded as a “YES” parameter value. The recorded data will therefore consist of three values: YES, NO, non-compliance. There shall be no outliers as this is a binary survey.

- (b) For $B_{y,new}$, the interview and test process will take place in the kitchen of the user. The survey consists of measuring the amount of firewood or charcoal used over a period of time, as prescribed by the KPT protocol. Field workers will be trained to follow published and internationally recognized KPT guidelines for KPTs. They will be trained through pilot survey trials during which their comprehension and competence will be graded by a qualified supervisor; only fieldworkers showing a high level of comprehension and competence in recording of accurate results will be recruited into the full survey. Each test subject will be visited and will demonstrate how cooking fuel is stored. The fieldworker will then ask the subject to create a specific store of fuel for exclusive use for cooking over a period of the next three days. The fieldworker shall weigh and record the weight of the test fuel. The subject will then cook according to their typical routine for the next three days. The fieldworker will make successive visits to ensure that the test fuel is being used exclusively, and will eliminate from the sample any subjects not complying. If extra fuel is required, the fieldworker will ensure that this is weighed before it is added and the adjustment to the records is accurately made. At the end of the test period, the fieldworker will re-weigh the test fuel. The overall quality control and assurance strategy is the presence of well-trained field workers acting under expert supervision, visiting their test subjects at least once per day, and asking questions about exclusive use of the monitored fuel store. These interviews will reveal if any incorrect use of the monitored fuel store has taken place, and any such incidence results in elimination of the non-compliant test. If at the end of the test period, a particular test result shows a very unlikely result, this will lead to post-test interviews to uncover the reasons, and if it is found conclusively that the test procedure was faulty, then that result is eliminated. During the test period, the fieldworker records how many persons are eating and what food types are being cooked, in order to provide a full picture of the kitchen activity during the test period. This provides a further control on non-compliance, as it provides a continuous flow of relevant information which leads to accurate tracking of correct use the monitored fuel store. It also creates a full body of information, so that the interviewer can detect whether or not the test is fully compliant. Outliers shall be eliminated during analysis following the prescription of the Sampling and Survey Guidelines Version 3.

Analysis

- (a) In the case of DOF, the mean value of DOF is derived from the data collected, and the precision achieved at a confidence level of 95% is calculated using the equations prescribed by EB69, Annex 4. If the precision falls below 10%, the sample size is increased or the lower bound is taken instead of the mean as recommended by the methodology, depending on practical circumstances. This result is used to calculate the mean annual CO₂ saved, *ER per user*, as in **Equation 4**.

(b) in the case of $B_{y,new}$, the mean value of $B_{y,new}$ is derived from the values measured during the sampling tests, and the precision achieved at a confidence level of 95% is calculated using the equations prescribed by EB69, Annex 4. If the precision falls below 10%, the sample size is increased or the lower bound is taken instead of the mean as recommended by the methodology, depending on practical circumstances.

This result is used to calculate the mean annual CO₂ saved, *ER per user*, as in **Equation 4**.

ER_y per user on average (taking into account average drop-off)

$$= (B_{old} * L_{NRB} * L_{POA} - B_{y,new}) * (1 - DOF_y) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} \quad (4)$$

The derived value of *ER per user* is divided by 365 days to generate a daily emission reduction figure ($ER_{peruser,day}$), so that it is possible to calculate the accumulated emission reductions of many Wonderbags, each adopted for first use at different times of year. This done by first counting the number of days which have elapsed between the date of first use of the individual Wonderbag and the date representing the end of the monitored period; this number of days is multiplied by $ER_{peruser,day}$, so giving an estimate of the total emission reduction of each user within the period monitored. The total emission reduction is then calculated as the sum of the emission reductions of each user within the monitored period. This is expressed by the following equation:

$$ER_{monitoring\ period} = \sum_x ER_{peruserday} * D_x$$

Where

$ER_{monitoring\ period}$	Emission Reductions achieved over a specified time period, the monitored period
$ER_{peruser,day}$	Average emission reduction per Wonderbag user per day
D_x	Number of days elapsing between first use of Wonderbag by user and the end of the monitoring period.
x	All users with date of first use within the monitored period

**Appendix 1: Contact information on entity/individual responsible for the PoA**

Project Owner and CME

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Consultant responsible for the POADD and first CPADD

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Appendix 2: Affirmation regarding public funding

Not applicable (See Part I, Section A.7 above)



Appendix 3: Application of methodology(ies)

Further background information on ex ante calculation of emission reductions

Supporting documents are provided which include excel calculation of emission reductions and a report on the pre-validation survey which provided estimates for parameter values.



Appendix 4: Further background information on ex ante calculation of emission reductions

See section B.6.3. above.



Appendix 5: Further background information on the monitoring plan

See Section B.7.2 above



History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities" (EB 66, Annex 13).
01	EB33, Annex43 27 July 2007	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration		